thrive in this colony there can be little doubt, and their great value, as well as singular peculiarity, would amply justify the moderate amount of trouble and expense the attempt to introduce a small number would involve.

The Horse was introduced by the Spaniards, and greatly aided them in their rapid and bloody conquest of the timid and gentle natives, who were equally surprised at the strange animals their invaders rode, and the novel weapons they used. There has been very little care taken by the Spaniards to improve the breed of this useful animal. They are generally allowed to roam wild on the open plain, where they are caught with the lazo as required. A superior breed, however, is to be found in Peru and other parts of this extensive continent. The mules from Upper and Lower Peru are of a superior quality, and form a considerable article of export to the Northern States, where they are extensively employed for the purpose of transport in the mountain regions.

The Peruvian pony is a small, hardy, sure-footed animal. It is capable of enduring fatigue to nearly as great a degree as the mule, but for mountain travelling the latter is generally preferred for its well-known sure-footed quality. Having thus briefly presented an account of the most useful domesticated animals of South America, I now leave it to the Philosophical Institute to consider what steps may be deemed requisite to secure the benefits likely to result to this colony from the introduction of some of these useful animals.

Art. VIII.—*On the First Technical Use of Gold by the Aborigines of South America, with a description of the Indian Tombs.* By P. Nisser, Esq.

[Read before the Institute 22nd June, 1859.]

(With a Plate.)

The present times furnish ample illustration of the influence gold has had in extending civilization and promoting the rapid populating of previously desert regions.

Gold, as the representative of material wealth, has always exercised a powerful influence on the actions of mankind. It is, therefore, highly interesting as well as instructive, to observe the effects produced on the natives of the wilderness

by the first discovery of this metal; and, it is worthy of especial note that it served a most important purpose in arousing the dormant intellectual faculties, and calling into activity the inventive genius of the untutored savage. In fact, gold and copper have, in different parts of the globe, served a most important purpose in awaking the first sparks of genius, and inducing efforts to obtain some of the benefits these metals confer on those who, by their ingenuity, could turn them into articles of utility or ornament.

The history of the gradual advance in civilization of barbarous tribes shows us, among other important facts, that where no metals where found by the inhabitants, improvements in domestic conveniences were very limited; and, we also find that the discovery of metals gives the first impulse towards an early civilization. By further attention we shall likewise find that, to a certain degree, moral improvements were stimulated or retarded as the material progress of the people advanced, retrograded, or remained stationary.

Gold, we have reason to believe, was, in many parts of the world, the first metal brought into use. This was the case in South America. As soon as this valuable metal was known to be easily liquified by strong heat, it may be presumed that the desire of producing some articles of fancy as ornaments was excited. Then the first casting of some simple trinket was made. In such rude and clumsy castings we have the first proofs of this metal being applied to technical purposes, and also the first step in early civilization. It is true that the use of gold by the aboriginal inhabitants of South America was the indirect cause of much suffering to them, as their valuable massive ornaments excited the cupidity of their invaders; but the effects of the early use of this metal were of considerable value to the nation long before the disastrous invasion by the Spaniards.

Copper, also, came under notice; as, like gold, this metal is found in a native or metallic state; but, owing to the comparative scarcity of copper in some localities where gold was plentiful, the former was held in higher estimation than the latter, in consequence of certain improvements obtained by an alloy of copper and gold.

These two metals were the only ones we have any knowledge of having been discovered in that part of the continent comprising the elevated districts and table lands of the Andes, from the Atlantic ocean to the borders of the empire of Peru, which, at the time we speak of, was in a flourishing

state. To obtain the necessary heat for fusing gold, a furnace and a blast were found to be requisite; accordingly we find the very simple plan was adopted of making an excavation in the ground, and coating it with clay. In the centre some stones were placed as a fire-place; charcoal was then ignited, and the smelting pot, with the gold, placed. The heat of the burning charcoal was then increased to the required degree by a certain number of men supplying air by alternately blowing through long canes, protected at the ends with clay, so as to produce a constant blast in imitation of a double bellows.

The original inventors made the patterns and the moulds for their castings in the following primitive but effective manner. The beeswax having been used to make toys, in the form of reptiles and other animals, for the amusement of children, these insignificant playthings were afterwards used to reproduce, in gold, what they had imitated in wax. The fancy article of wax was, therefore, used as a pattern; it was embedded in clay, a small orifice in the mould being left, made also with wax, through which the melted metal could be introduced. These moulds were then carefully dried in the sun, and afterwards gradually heated so as to melt the wax, and leave the clay-casing or mould ready to receive the fluid metal. This simple and ingenious contrivance of the original inhabitants of South America was also used to procure more elaborate imitations of the flora and fauna of Mexico and Peru.

The Spanish conquerors reached the interior of South America in the year 1545, the northern portion of which they called "Capatania de la Nueva Granada." This included the coast land between the Gulf of Darien and the Cape de la Hacha, reaching the first degree north latitude. The interior part of this Spanish colony occupied a considerable extent of the region of the Andes, the inhabitants of which were represented as a "timid and quiet people." The gold trinkets we have alluded to were here, as elsewhere, used for ornaments by the chief or Cacique, as well as the community in general, though a distinct class of ornaments seems to have been reserved for the chiefs. The principal object of the new visitors was gold, which was eagerly sought for in any form. Glass beads, and articles made of iron or steel, which were great novelties to the Indians, were readily bartered in exchange for their gold ornaments. There were, however, some ornaments they

were very unwilling to part with; such as images of the chief and his wife, in a sitting posture, made of gold, about ten inches high, and sixteen ounces weight, and some other imitations of various animals, which were used as ornaments in the dwellings of the chiefs, and were regarded as superior articles of art. These were the cause of the first attack on the property of the inhabitants. In revenge for the outrages they suffered from their oppressors, when gold ornaments became scarce, they refused to show where they obtained this metal in its natural state.

The ornaments obtained by the first visitors being regarded merely as articles of commerce, they were mostly melted into ingots, so that very few of those specimens of early art remain; but as they were in the habit of burying some of their ornaments in the tombs of the caciques, and as some of these burial-places are occasionally discovered, samples of these ancient ornaments have been secured, which furnish interesting illustrations of the first attempt in this branch of industry. We shall, therefore, proceed to describe

THE INDIAN TOMBS.

Burials were performed by the Peruvians in two different ways, above and below ground. The still existing elevated mounds remind us of the Egyptian catacombs, though those of the Peruvians are smaller, and constructed of stone and earth. These monuments of the Incas are of a pyramidal form and different dimensions, some being more than one hundred and fifty feet high, and are known by the name "Cucará." They are built in subdivisions formed of large slabs of slate. In one of these divisions the body was placed, and in another the utensils and ornaments. Sometimes gold in its natural state was left in an earthenware vessel, mixed with pounded charcoal. Where the chief or governor was interred, an imitation of the sun or the moon was placed in the tomb. The sun was represented by a flat round plate of gold, or alloy of copper, about an eighth of an inch thick, and sometimes more than twenty inches in diameter. The moon was made of a silver plate, showing the half moon. A neck ring and bracelets, a waistband and ankle rings, made of gold, sometimes alloyed with copper, were also left with the body of a chief. These rings are from one and a quarter to two inches in width, and opened and closed as a spring. They are thin, and perfectly equal in width and thickness throughout. In fact, they are so perfect that it is difficult to imagine

how such laminated rings were produced, considering the deficiency of suitable implements for such delicate and exact work. There are several of these tombs above ground still to be seen.

The excavated tombs, as found in our times, are all alike throughout South America. The Spanish conquerors having entered the territory of "la Capitania de la Neuva Granada," and collected all the gold they could among the Indians, turned their attention to the natural sources of gold, and also to the burial places, which soon became objects of much interest to the gold-seekers. These tombs are always found on some isolated range with sharp outlines, so situated as not to admit of any water accumulating, and no apparent probability of water being led to it. In hills so situated the excavations are discovered by observing certain concavities on the surface; but where a thick forest exists, with a dense undergrowth, often of several feet, it is necessary to clear the ground by fire. It is generally allowed that a long period has elapsed since these tombs were closed, as by the accounts of the Mexicans and Peruvians, given at the time of the conquest, their calculations amounted to about two thousand years. The excavation is circular and perpendicular, and three or four feet in diameter, dug out of the decomposed syenitic rock. At the depth of nine to eleven feet charcoal is found among the soil, under which a flat stone (some kind of slate) covers the pit, on removing which, the edge of a perpendicular slab is observed. At about four feet deeper the bottom of the tomb is reached, and on the perpendicular slab being removed, a horizontal excavation is seen towards the east. This is about four feet in height and the same in width, but somewhat more in length. Here the bones of the defunct are found, the body having been placed in a sitting posture, with the face towards the east, that is towards the rising sun, regarded as the "King of the Heavens." The bones are generally found in such a decayed state that they will not admit of being handled. The earth, which has more or less fallen in and mingled with the remains, is gathered and brought under the washing process, and the trinkets thus obtained are partly of gold, with its natural alloy (silver), and partly gold with copper. On one side of the remains a large earthenware vessel is found, covered with a piece of slate, and in some instances a sediment has been found deposited from the drink, the Indian "chicha," left with the deceased. On the opposite side, perfectly decayed,

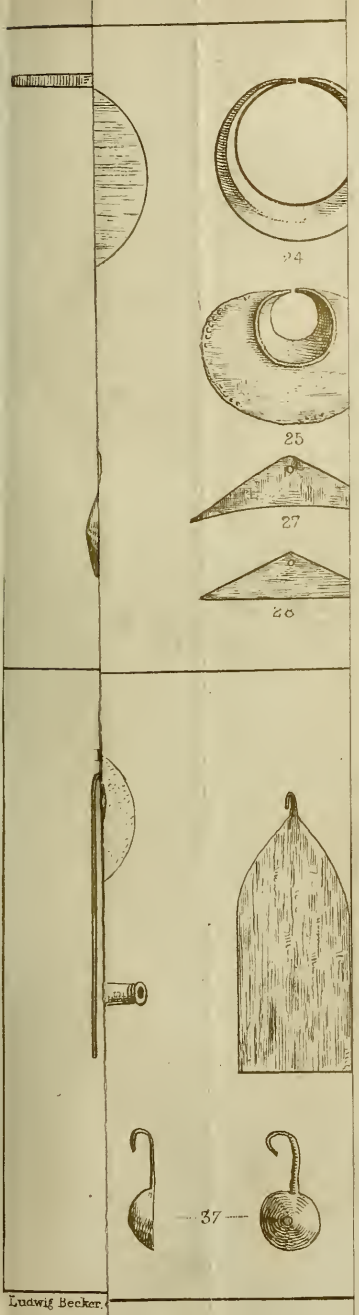
ears of Indian corn have been found. In a niche cut out of the end of the tomb, a vase of earthenware is sometimes found, covered with a stone, and filled with pounded charcoal, in which the remaining trinkets and gold-dust, left with the occupant of the grave, had been deposited. Implements for smelting gold, and some tools made of gold and copper, are sometimes, though but rarely, found in the pot occupying the niche. The Spaniards, who during three centuries have gathered gold from the fluvial deposits, have found many of these burial places very remunerative.

Some localities show that systematically arranged cemeteries have formerly existed where two excavations in the centre, of greater depth than the surrounding ones, were found. The deep graves appear to have been appropriated to the chiefs and their families, and the numerous others to the inferior classes. These burying places are termed "Pueblo de Indios," but these larger cemeteries are now seldom found. Traditional accounts of certain localities are still preserved, and eagerly sought after, where great treasures are said to have been buried. In like manner reports are often heard of rich fluvial deposits of a more recent date, where the proprietor is said to have had a measure corresponding to about twenty to twenty-five pounds weight, on collecting his weekly produce. This may be regarded as probable, if we consider that as many as from two to three hundred African slaves were often employed in mining pursuits by one proprietor.

The foregoing narrative supplies a proof that the aboriginal inhabitants of South America had some indefinite notion of a future state; they appear to have believed "that their deceased relative or friend had a long way before him," and that he would require some refreshment in his long journey to "reach the stars." This idea still extensively prevails.

The trinkets which are now submitted for the inspection of the members of the Institute are of the most ancient date, and form a collection from which a correct idea may be gained of the most simple as well as the most elaborate workmanship of these people, and supply a good illustration of the valuable influence the discovery of metals exerted in advancing early civilization.

Figs. 1 to 37 in the plate illustrate the trinkets in half size, and Figs. 38 to 41 the natural size. (See explanation of PLATE in the next page.)



Ludwig Becker.